Information systems development as action research: soft systems methodology and structuration theory

PhD submitted 2000
The plot is easily explained:

It starts with a real life tale of companies and computers - a sad one. The tale has hardly got started before it splits into two - a tale of two citizens. The first, a story of people struggling in the world, of problems and solutions, is told by the worldly-wise practitioner. His friend and colleague, the academic, tells the second: full of marvellous and learned devices. Though the two stories are different, they mirror each other in curious ways.

Of course they turn out to be the same story, thinking and doing, told by the same person. When the stories are put together a third story emerges, which is new, yet old at the same time. This is the story which fascinates us. We think we know this story, but we don’t really – what we glimpsed will soon be part of yet another story.
Research design

- Soft systems methodology: development of practical problem solving in ISD

- ISD problem solving framework informed by ST and SSM

- Structuration theory: development of theoretical understanding of social components of ISD

- Action research project 1: ISD in Regional Train Operating Company

- Intranet development at MMU

- Action research project 2
SSM at North West trains

Data Processing arrangements
RT defect resolution analysis

<table>
<thead>
<tr>
<th>activity</th>
<th>IB requirements</th>
<th>information analysis</th>
<th>processing requirements</th>
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<tbody>
<tr>
<td>report defects</td>
<td>record + store details of incidents and defects to units</td>
<td>-</td>
<td>-</td>
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<tr>
<td>plan repairs</td>
<td>store regular maintenance schedules, depot + outstation work schedules, provide bulletin board for common repairs, provide filters instructions</td>
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<td>-</td>
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<tr>
<td>carry out repairs</td>
<td>provide stability reports, provide instructions for filters, provide maintenance schedules</td>
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<tr>
<td>report repairs</td>
<td>report regular maintenance by exception</td>
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analyze relevant data

maintenance computerized information system

maintenance depot

outstation fitters

log repairs

log defects

maintenance controllers

phone in defects

RTOC customers

RTOC staff
SSM model of Information Systems Development

a human activity system served by an information system (another human activity system devoted to the organised provision of information) usually supported by computer and communications technologies (IT)

organised change

a more efficient, effective and efficacious human activity system served by an improved information system supported by (improved) computer and communications technologies (IT)
Structuration theory

structure

- signification
- domination
- legitimation

modality

- interpretative scheme
- facility
- norm

interaction

- communication
- power
- sanction
<table>
<thead>
<tr>
<th>signification</th>
<th>domination</th>
<th>legitimation</th>
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<tbody>
<tr>
<td>Commercial motivations replace nationalised industry, profit + cost cutting replaces safety as key driver. Meanings attached to pre-privatisation events less relevant in commercial environment. Survive in commercial jungle or go under.</td>
<td>Conventional hierarchical divisional power structure. Researchers considered to have expert power+ message delivering (access to authority) power. Managers at the top of the pile, then engineers, then train crew, then clerical staff.</td>
<td>Rhettoric of legitimisation by cost cutting - not always born out in practice. ‘Quick wins’ and fast solutions to external problems valued. ‘Oily hands’ (heavy engineering) work legitimate, whereas information work less so. Researchers draw legitimation from their academic background.</td>
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<tr>
<th>interpretive scheme</th>
<th>facility</th>
<th>norm</th>
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<tr>
<td>Managerial schemes (macho + commercial) distinguished from engineering schemes (craft skills) and information working schemes (little appreciated or valued). Many of the schemes (e.g measuring maintenance performance) need rethinking in the new environment.</td>
<td>Resources allocated after long decision-making periods. Technical director appoints researchers to re-establish authority - therefore subordinates have to outwit them, rather than collaborate. Small investments available for reactive problem solving.</td>
<td>Poor information management practice accepted, or unnoticed. Rhettoric of co-operation and harmony normally maintained, even if the practice is different. Maintenance controllers engaged in the work of keeping the trains running, rather than prioritising information work reactive approach to problem solving. Nobody really accepts responsibility for IS initiatives.</td>
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<tr>
<th>communication</th>
<th>power</th>
<th>sanction</th>
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<tr>
<td>Political and affected by rivalries rather than truly co-operative. Maintenance depot scapegoated and consequently trying to establish clean bill of health through consultants. Outdated computer systems heavily implicated in maintenance communications. Workarounds common where computer systems don’t offer suitable help. Poor communications with system developers. Poor communications with drivers.</td>
<td>Weak technical director’s authority openly flouted on occasion. Maintenance manager withdraws co-operation, (but not rhetoric of co-operation) with researchers. He sets tone for co-workers who follow. Researchers exercise power to report to directors</td>
<td>The ultimate sanction - dismissal - very much in prospect as a result of franchising, and heavily influencing other perceptions. Sanctions with researchers take the form of withdrawal of co-operation.</td>
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Frameworks for intervention 2

- ISD theories, methodology
- Inform
- Form
- Investigate
- Take actions
- Guide
- Transformation - organised change

- Development group
- Purposeful human interactions usually supported by computer and communications technologies ICT
- Improved purposeful human interactions supported by (improved) computer and communications technologies ICT

- Conceptualisations of improved interactions supported by ICT
Intervention 2

International Studies IV

By popular demand

The remaining lectures for Week 23 and Week 24 will be re-ordered so that the exam and exam review will take place on the last Friday of term.

This will mean that your other submissions will be out of the way.

We hope to return the second assignment on that day.

This Unit

Welcome to the home page for IS 4. This is the third time that this Unit has run since it replaced the compulsory fourth-year language unit in 1996.

During that time there have been some dramatic changes in the state of the world economy as a whole and of several individual economies in particular. However, we shall see that the processes underlying these outcomes are relatively stable.

Since we are dealing with the global reach of trade, manufacturing and related services, and the underlying technologies, we will make extensive use of both Internet and Internet. The resources section of the Unit gives access to a number of Web-based resources to assist you.

The DBIT Intranet - a useful resource for communication and collaboration for staff and students alike

Peer Assessment - forms and guidelines available to read, download and print.

Examination Boards 1999 - Dates Locations and Times

Industrial Placement Opportunities with Rolls-Royce and Bentley Motor Cars

New - Summer Placement Opportunities

Copyright - the myths exploded, and exploded. Keeping yourself out of the court room in the Internet age.

Dennis Dunn - Head of Department of Business Information Technology - Interviewed recently.

Welcome - a welcoming message from the Head of Department

Assignment Hand-In Slots - Details of hand-in time slots, arranged by Course

The DBIT Intranet - What it is, who it's for and, more importantly, what it's actually for!

The Great Welfare Taped In - starts here with a useful checklist...
### Detailed planning: intervention 2

<table>
<thead>
<tr>
<th>Stage</th>
<th>ITI model component</th>
<th>Action research output</th>
<th>Tools</th>
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<tbody>
<tr>
<td>1. Analysis</td>
<td>Present state (interactions)</td>
<td>Negotiated formal review of the current situation</td>
<td>Interaction models, rich pictures, structurational analysis (interactions)</td>
</tr>
<tr>
<td>2. Conceptualisation</td>
<td>Future improved state (interactions)</td>
<td>Agreed development scenario</td>
<td>Interaction models, root definitions (scenarios)</td>
</tr>
<tr>
<td></td>
<td>Organised transition (change, transformation) between the present state and the desired state</td>
<td>Agreed development plan</td>
<td>Transformation models, structurational analysis (change)</td>
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Intranet: SSM analysis
## Structurational Analysis: Intervention 2

### Interaction: Intranet Development System

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<tr>
<th>Meaning</th>
<th>Power Structure</th>
<th>Norms</th>
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<tr>
<td>A technical semantic is given some priority, but often badly understood (Mozilla domain)</td>
<td>Rather ambiguous. DD powerful but not really involved, GM + MS have sapiential power, but GM perceived as erratic and MS doesn't want responsibility. MF has little authority and responds to conflicting demands. Only DD has authority to demand a lecturer's compliance, and that doesn't always work! Technical expertise is valued, but no way of sensibly resolving disputes between GM + MS.</td>
<td>MF responsible for most of donkey work, solving technical problems etc. Role confusion and lack of leadership. Reactive to difficulties and often technically focused - little clear direction. Extra workload without clearly established benefits. MF asked to investigate various technical possibilities which are then shelved. Others have ideas but no forum for discussion or method of adoption. Some student feedback collected, but they are really left out of the loop. Development reliant on wider technical platform - speed is a big problem.</td>
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<th>Context</th>
<th>(IS role)</th>
<th>Action</th>
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<td>Quite a lot of email communication - little via the intranet</td>
<td>Staff have equal power to write to the intranet - students cannot</td>
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### Communication

Occasional dept meetings - mostly informal. MF is out of the daily loop by virtue of being geographically separate. Students respond to unit tutors with problems, much less to MF. GM + MS communicate badly. Email communication is rather ineffective, it took a dept meeting to sort out the file protocol problem.

### Use of Power

JR has to resort to exhortation, chivying, and mild humiliation to make progress. Lecturers display autonomy by not doing anything they don't feel is productive.

### Sanctions

Few available. JR embarrasses DD. MF might be sent back to IS dept. Mistakes are not very visible.
Intervention 2: planning change
Conclusions
Thesis design

Part 1 – Introduction, research design, case study
- Chapter 1: Introduction
- Chapter 2: Research design
- Chapter 3: RTOC action research project

Part 2 – Soft systems methodology
- Chapter 4: Theoretical review
- Chapter 5: Analysis of RTOC
- Chapter 6: Theory development

Part 3 – Structuration theory
- Chapter 7: Theoretical review
- Chapter 8: Analysis of RTOC
- Chapter 9: Theory development

Part 4 – Intranet project and conclusions
- Chapter 10: Framework for intranet action research project
- Chapter 11: Intranet action research project
- Chapter 12: Conclusions
Related publications

The plot was simple, really.

It started with a real life tale of companies and computers - a sad one. The tale had hardly got started before it split into two - a tale of two parts. The first, a story of people struggling in the world, of problems and solutions, was told by the worldly-wisely wise practitioner. His friend and colleague, the academic, told the second: full of marvellous and learned devices. Though the two stories were different, they mirrored each other in curious ways.

Of course they turned out to be the same story, thinking and doing, told by the same person. But when the two stories are put together, a third story results, which is new, yet old at the same time. We think we know this story, but we don’t really. Some of it we knew once, but forgot. Some it we can glimpse, darkly (but this is for the future). Sometimes we are certain, but we deceive ourselves. The third story is the story of learning, and this is the most interesting story of all.